FURTHER ADDITIONS TO THE FLORA OF WESTERN OREGON

By J. C. Nelson

In this journal for February, 1918, I printed a list of plants growing spontaneously within the limits of Piper & Beattie's Flora of the Northwest Coast that had not found mention in that manual. I ventured the assertion at the time that further field-work would materially add to this list, not only because of the rapid introduction of foreign species, but also because the geographical limits of many native forms are not clearly understood. The list which appears below, representing the result of another season's collecting, seems to show that my prediction was not wholly unjustified. In spite of the fact that I made only one trip this year that took me more than ten miles from home, the number of unreported species shows no falling off from previous years.

In the case of the foreign plants, there is nothing specially remarkable about this—in fact, it is what is taking place in much the same degree on the Atlantic seaboard. The weed-flora of all sections of the temperate zone tends toward a certain uniformity; and this tendency becomes more marked as means of transportation multiply. The process may be compared to the diffusion of a liquid through another medium—and the point of saturation is still far away. Individual species may appear and disappear, but the rising tide of the aggregate shows a steady increase.

The *native* species that have not appeared in previous lists seem to fall into two general classes: (1) Californian species that were thought not to extend north of the Umpqua Valley; (2) plants characteristic of the Upper Sonoran Zone east of the Cascades, which on account of the humidity of western Oregon were not expected to occur here. In regard to the first group, there is of course no *a priori* reason why the Californian flora may not extend beyond the limits assigned to it. The state line simply does not exist on a botanical map; and there is neither

a mountain barrier difficult of passage, nor a thoroughgoing change of climatic and soil conditions to bar the way. The percentage of species that are typically Californian of course becomes steadily less as we advance northward; if 50 per cent of the Californian forms reach the Umpqua valley, not above 10 per cent are found in that of the Willamette; but there is no fixed point beyond which they totally disappear.

As for the second group, any attempt to determine the distribution of species in western Oregon on a purely zonal basis will prove unsatisfactory. In the arrangement of plant zones, that part of Oregon lying west of the Cascades has been assigned to the Humid Transition, while the Upper Sonoran is considered to exist east of the Cascades only. But this arrangement fails to take account of the fact that we have two very different types of climate in western Oregon. During nine months of the year we have heavy rainfall and high humidity; during the other three months the rainfall is negligible and the atmosphere becomes very dry. During this latter period the conditions of growth in the western valleys are almost identical with those which prevail in the semi-arid region east of the Cascades, and only the most strongly drought-resisting species are able to continue their growth. If therefore a characteristically Upper Sonoran species were introduced into the Willamette Valley at the beginning of the dry season, it would find no difficulty in adjusting itself to its environment; nor would the mild winter offer any serious obstacle to its survival. Certain localities in the region about Salem, where the soil is thin and rocky or gravelly, especially on slopes facing the west, offer conditions before the end of the long summer that are as truly Upper Sonoran as in any part of eastern Oregon. These conditions being uniform in these localities, one would expect the flora to conform; and as a matter of fact, there are localities about Salem where the flora differs very slightly from that of a similar area in the semi-arid districts. A zonal map that was wholly accurate would have its "Humid Transition" region thickly dotted over with larger or smaller patches of the color used for the Upper

Sonoran; and such a map would have little value unless it were made out in two forms—one for the wet and one for the dry season.

Specimens of all the plants named below, unless otherwise indicated, have been deposited in the Gray Herbarium. Mr. J. Francis Macbride has very kindly verified and corrected my determinations in the case of all except the sedges, which have been submitted to Mr. K. K. Mackenzie and remain in his possession. All these specimens were found growing spontaneously, and I have omitted several that, although common, seem still dependent upon cultivation. No species collected outside the limits of Piper and Beattie's Flora has been included.

1. *Equisetum hyemale* L. var. *robustum* (R. Br.) A. A. Eaton. In swampy ground two miles east of Brooks, Marion Co.
2. *Avena barbata* Brot. Common along the Southern Pacific right-of-way for three miles south of Salem, and occasional elsewhere along the railroad.
3. *Avena sativa* L. A common escape along railroads and in waste places.
4. *Deschampsia holciformis* (Presl) Steud. In dry soil about the lighthouse on Yaquina Head. Reported by Hitchcock from Garibaldi, Tillamook Co.
5. *Bromus polyanthus* Scribn. Common on street-parking and in waste ground about Salem.
6. *Puccinellia paupercula* (Holm) Fernald & Weatherby, var. *alaskana* (Scribn. & Merr.) Fern. & Weath. On beaches and tide-flats about Newport. Has been confused with *P. distans* (L.) Parl.
7. *Triticum aestivum* L. A common escape along railroads.
8. *Carex densa* Bailey. In hard dry soil by roadside, Eugene.
9. *Carex olympica* Mackenzie. Not uncommon in wet meadows and ditches.
10. *Carex unilateralis* Mackenzie. In dry ditch by roadside, one mile east of Salem.
11. *Carex tenera* Dewey. In a wet meadow near Loewi stop on Oregon Electric Ry., Marion Co.
12. *Carex angustior* Mackenzie. Rocky shore of Silver Creek above the Falls, Marion Co.

13. *Salix babylonica* L. A large tree in low ground near stream in pasture, three miles west of West Salem, Polk Co. No dwelling in the immediate vicinity. (Specimen deposited with the Arnold Arboretum.)
14. *Alnus rhombifolia* Nutt. Not infrequent in thickets along streams about Salem.
15. *Polygonum aviculare* L. var. *vegetum* Ledeb. In yards and waste places, Salem.
16. *Polygonum confertiflorum* Nutt. In dry soil, especially in dried mud, about Salem. Collected by Howell at St. Helens.
17. *Polygonum hydropiperoides* Michx. Common in slow streams and swampy ground.
18. *Spergularia sparsiflora* (Greene) A. Nels. Muddy tide-flats in Yaquina Bay, Toledo.
19. *Delphinium Nuttallianum* Pritzel. In ballast on S. P. tracks, one mile south of Salem.
20. *Delphinium depauperatum* Nutt. Not uncommon on gravelly prairies about Salem.
21. *Ionopsidium acaule* (Desf.) Reichenb. A common and troublesome weed in garden of Kerr estate, Elk Rock.
22. *Thysanocarpus curvipes* Hook. forma *madocarpus* (Piper) Macbr. Occasional in dry rocky soil.
23. *Brassica Rapa* L. Persisting in orchards and fields—very common.
24. *Brassica oleracea* L. var. *acephala* DC. Common in cultivation, and often persisting in fields, etc.
25. *Lepidium sativum* L. Occasional in old gardens about Salem.
26. *Peltiphyllum peltatum* (Torr.) Engler. Not collected, but observed from car-window along Mary's River in Benton Co. Very common in southwestern Oregon.
27. *Pyrus Malus* L. A common escape to thickets and roadsides.
28. *Rubus thyrsanthus* Focke. A frequent escape in dry sandy soil.
29. *Rosa canina* L. Not infrequent along streams and roadsides. —Forms not typical and identity in doubt.

30. *Potentilla canadensis* L. A form with double flowers, possibly a hybrid, is not infrequent on lawns and roadsides at Salem.
31. *Vicia tetrasperma* Moench. In gravel on railroad tracks, Sidney Marion Co.
32. *Vicia angustifolia* (L.) Roth, var. *segetalis* (Thuill.) Koch. In dry ground along railroad near Loewi stop, Marion Co. Also found on ballast at Linnton.
33. *Ailanthus glandulosa* Desf. Occasional on lawns and street-parking at Salem. The seedlings often bear flowers in their first year!
34. *Reseda alba*. L. Occasional in waste ground about Salem.
35. *Viola Sheltonii* Torr. In rich woods on west slope of Spencer's Butt, seven miles south of Eugene. A Californian species, but reported from the White Salmon Valley, Washington, by Suksdorf.
36. *Oenothera grandiflora* Ait. Common in vacant lots and alleys at Independence, Polk Co.
37. *Chaerefolium Anthriscus* (L.) Schinz. & Thellung. In tall grass in State Fair Ground, Salem.
38. *Scandix Pecten-Veneris* L. On railroad track near Chemawa, Marion Co. (Specimen in herb. Willamette University, Salem.)
39. *Apium graveolens* L. Occasional on rubbish-heaps about Salem.
40. *Ligustrum vulgare* L. An occasional escape to roadsides in Polk Co.
41. *Convolvulus polymorphus* Greene. In waste ground near railroad station, Salem. Common in southwestern Oregon.
42. *Myosotis arvensis* (L.) Hill. A weed in gardens, Salem.
43. *Amsinckia Menziesii* (Lehm.) Nels. & Macbr. Not uncommon in grain-fields and waste places. Most of what passes as *A. intermedia* F. & M. and *A. lycopsoides* Lehm; is to be referred here.
44. *Amsinckia arenaria* Suksd. Occasional on railroad tracks. Apparently a good species.

45. *Cryptantha flaccida* (Dougl.) Greene. In very dry soil on border of gravel pit, Salem. A typical Upper Sonoran plant.
46. *Cryptantha Torreyana* (Gray) Greene, var. *grandiflora* (Rydb.) Nels. & Macbr. Not infrequent in dry rocky woods.
47. *Allocarya californica* Greene. Not uncommon in wet places.
48. *Prunella vulgaris* L. The form on lawns about Salem seems to belong to the species rather than to any of the indigenous varieties.
49. *Prunella vulgaris* L. var. *calvescens* Fernald. In wet meadows north of Salem. A white-flowered form (forma *alba* J. C. Nels.) has also been collected.
50. *Linaria Elatine* (L.) Mill. Reported from Eugene by Mr. R. V. Bradshaw. I have seen a drawing only, but the spurred corolla, prostrate stem, hastate leaves and yellow-and-purple flowers seem to indicate this species.
51. *Collinsia Rattani* Gray. A single specimen, growing in gravel about the railroad station at Gerlinger, Polk Co. Evidently introduced, but indigenous southward.
52. *Veronica officinalis* L. In an old clearing in deep coniferous woods at Silver Creek Falls, Marion Co.
53. *Plantago subnuda* Pilger. On tide-flats in Yaquina Bay, Toledo.
54. *Plantago lanceolata* L. var. *lanuginosa* Mert. & Koch. On railroad tracks east of Salem; also in waste ground at Portland.
55. *Tragopogon pratensis* L. On refuse-heaps about State Prison, Salem.
56. *Agoseris heterophylla* Greene var. *normalis* Piper. Occasional on dry rocky hillsides in Polk and Marion Cos.
57. *Crepis setosa* Haller f. An abundant weed in waste places in Marion and Polk Cos.
58. *Eriophyllum ternatum* Greene. In a dry meadow, six miles southeast of Salem. Perhaps not distinct from *E. lanatum* (Pursh) Forbes.
59. *Calendula officinalis* L. A frequent escape to thickets and waste places about Salem.

60. *Achillea Millefolium* L. var. *nigrescens* E. Mey. Common on sand-dunes about Newport.
61. *Chrysanthemum maximum* Ramond. Common in cultivation, and frequently escaping to waste places, Salem.
62. *Artemisia Absinthium* L. Occasional in vacant lots, Salem.
63. *Senecio Bolanderi* Gray. On damp cliffs along the beach at Newport. Common in southwestern Oregon.
64. *Micropus californicus* Fisch. & Mey. Abundant on a dry rocky hillside six miles southeast of Salem. Also near Orville, Marion Co. Abundant in southwestern Oregon.
65. *Centaurea Jacea* L. In waste ground on campus of Willamette University, Salem.
66. *Centaurea consimilis* Boreau. In waste ground, Eugene. Also collected on ballast at Linnton.

Thirty-three of the above list, or exactly 50 per cent, are clearly introduced; the other 50 per cent seem to be native.

This list of 66 species, added to the 153 reported in my former article, gives a total of 219 species that find no mention in the latest manual professing to cover this region. About 125 of these, or approximately 57 per cent, may be regarded as introduced. The prediction that the original 1617 species of the Flora of the Northwest Coast could be raised to two thousand by a more thorough survey of the field seems nearer realization than ever; for there is no reason to suppose that the field has been yet exhaustively studied, or that the introduction of foreign species has been checked.

REVIEWS

Ferns of Tropical Florida*

One of the most interesting floristic regions of the United States is the southern tip of Florida, the only portion of our area in which the flora of tropical America is at all largely represented. No botanist knows this region so well as Dr. Small; and his summing up of our knowledge, to date, of even one of the predomi-

* Small, J. K. Ferns of Tropical Florida. Pp. ix + 80. 5 half-tone plates and 53 text-figures. New York, published by the author. 1918. Price $1.55.